1924

Sugar beets in Louisiana

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BATON ROUGE, LOUISIANA

SUGAR BEETS IN LOUISIANA

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FOREWORD

The results of the four years' work herein given on sugar beets are preliminary, and further investigations will be conducted. Larger acreages of the better varieties will be planted on different soil types so the economic problems can be more carefully considered.

New varieties will be given preliminary trials, at the same time, to attempt to find others that might produce a larger yield as well as a higher percentage of sucrose. Seed must be obtained from other sections as it has been impossible to grow seed in Louisiana. This condition may be a hindrance to constancy of results, or to improvement of plants, as breeding and selection to meet local conditions is practically eliminated.

If this crop should be suitable for commercial purposes, it will probably be better adapted to the small farm than to the large plantation. It is believed that a few acres grown by farmers within a distance of 40 to 50 miles of sugar mills can be more economically handled than larger areas.

Dr. W. C. Stubbs, for many years director of the Louisiana Experiment Station, started sugar beet investigational work at Kenner, Audubon Park and Baton Rouge. Dr. C. E. Coates[1] and others have continued this early work at Baton Rouge on bluff soils.

A large sum of money is invested in sugar houses and sugar house machinery by the sugar cane planters of Louisiana and is used only eight to twelve weeks in a year, as the grinding of the cane crop requires approximately that time. If this season could be lengthened eight to ten weeks by the utilization of a sugar-beet crop, the increased value of the sugar manufacturing machinery on Louisiana cane plantations would be considerable, as a comparatively small outlay would be necessary to equip the cane mills to handle beets. All the data hereafter given, unless otherwise designated, is from beets grown at Baton Rouge.

A planting of Vilmorin Improved beets was made November, 1898, and harvested the following May and June. The results of this first experiment will be found in Table 1.

TABLE 1.

Date of Planting—November, 1898.
Variety—Vilmorin Improved.

Date of Analysis	Average Weight of Beet—Grams	Sucrose %	Purity
May 2, 1899	600	9.89	73.00
May 3, 1899	870	8.13	74.30
May 15, 1899	1200	10.76	80.70
May 16, 1899	1980	8.59	74.10
May 31, 1899	1140	11.54	83.60
May 31, 1899	1500	9.49	76.50
June 6, 1899	960	12.61	91.30
June 6, 1899	930	14.96	90.60
June 10, 1899	600	12.64	89.70
June 10, 1899	1500	13.64	85.70
June 10, 1899	1080	11.99	91.50
June 10, 1899	1440	9.24	75.70
June 12, 1899	900	12.94	92.40
June 12, 1899	630	13.74	84.20
June 12, 1899	720	14.04	87.70
June 12, 1899	660	11.04	72.10
June 12, 1899	4560	8.14	70.70
June 12, 1899	2100	8.39	66.30
June 13, 1899	480	14.50	90.60

1. Journal of Industrial and Engineering Chemistry. Vol. 14, No. 3, page 213.

A wide variation is shown in the size and the sugar content of the beets. Coates reports that the beets were not uniform in quality; the ones weighing from one to two pounds appeared to be normal sugar beets while the larger ones resembled the mangels and, as the data show, were low in sucrose. There is no doubt that the seed was not of uniform quality and probably not all of the same variety. This work was repeated in 1899 with practically the same results. No other work was done until 1904, when Coates made one planting of Vilmorin Improved and one of Kleinwanzleben. See Table 2.

TABLE 2.

Variety	Average Per Cent Sucrose			
	April	May	June	July
Kleinwanzleben	5.7	4.8	5.5	3.3
Vilmorin Improved	9.2	6.8	7.6	7.3

Here, again, Coates reports that the Kleinwanzleben were large and extremely low in sugar content. The Vilmorin Improved were smaller and more uniform as to size than in 1898 and 1899, but the per cent of sucrose was considerably lower.

Further plantings were made of these two varieties in August, 1907; November 26, 1907; January 30, 1908. Results given in Table 3.

TABLE 3.

Variety	Date of Planting	Average Per Cent Sucrose		
		February	April	May
Vilmorin Improved—	August, 1907	14.76	10.90	....
	November 26, 1907	....	8.50	11.00
	January 30, 1908	....	6.60	8.90
Kleinwanzleben—	August, 1907	12.88	9.70	....
	November 26, 1907	....	7.63	9.60
	January 30, 1908	....	6.13	7.90

The winter of 1907-08 was mild, the August planting maturing beets in February. All results were far from satisfactory and as seed cannot be produced in Louisiana, the work was discontinued until more promising varieties could be developed.

1920-1921

Nothing further was done until the fall of 1920, when a co-operative project was arranged whereby Coates was to do the chemical work and Kidder, the agricultural part. Seed of six varieties were obtained.

Variety	Source
Kleinwanzleben (Michigan grown)	Office of Sugar Investigations, Bureau of Plant Industry, Washington, D. C.
Alvarado (Michigan grown)	Office of Sugar Investigations, Bureau of Plant Industry, Washington, D. C.
Dippe (Michigan grown)	Office of Sugar Investigations, Bureau of Plant Industry, Washington, D. C.
Kleinwanzleben elite (German grown)	Office of Sugar Investigations, Bureau of Plant Industry, Washington, D. C.
Great Western Home Grown	The Great Western Sugar Co., Denver, Colorado.
Jaensch Victrix 12844	Utah Experiment Station, Logan.

These varieties were planted on January 24, 1921. The plat used was well drained and fairly rich in organic matter. The seed bed was well prepared and laid off in three-foot rows. No fertilizer was applied. The first beets for analyses were harvested May 9, 106 days after planting. Three beets were taken from each row once a week for the chemical work. Table 4 shows the data.

TABLE 4.

Date of Planting—January 24, 1921.

Variety.

Date Harvested for Analysis	Jaensch Victrix (12844)		Great Western Home Grown		Kleinwanzleben (Michigan)		Alvarado		Kleinwanzleben (Germany)		Dippe	
	Sucrose %	Purity	Sucrose %	Purity	Sucrose %	Purity	Sucrose %	Purity	Sucrose %	Purity	Sucrose %	Purity
May 9	13.0	82.6	14.6	83.7	14.0	85.9	13.5	84.5	13.4	85.9	13.7	84.9
May 16	13.2	83.3	13.8	84.6	13.0	85.5	13.4	85.5	13.5	85.4	14.0	84.8
May 23	14.0	82.5	15.1	83.3	14.5	83.5	14.9	85.5	14.2	84.6	14.5	84.5
May 30	13.8	89.0	15.0	87.8	14.1	85.5	15.1	87.7	12.5	79.6	14.8	87.9
June 6	12.6	80.0	13.8	79.9	12.4	84.1	13.5	81.1	13.6	80.9	13.1	80.1
June 13	12.2	80.1	14.4	86.7	13.2	88.8	12.5	85.5	12.4	79.1	13.3	85.0
June 20	14.5	84.5	14.7	82.6	13.8	83.3	15.9	86.0	14.8	84.6	16.8	87.0
June 27	13.3	86.4	14.1	81.0	14.6	86.0	14.8	85.2	15.7	88.2	13.5	84.5
July 4	12.9	83.7	14.2	83.3	13.3	82.7	13.4	81.2	12.7	83.0	13.6	82.2
July 11	12.6	82.5	12.9	82.9	12.6	82.1	12.8	81.5	12.1	82.9	12.7	82.6
July 18	10.8	79.1	12.3	82.3	12.9	83.4	12.2	81.4	12.5	80.6	12.9	84.3
July 25	10.9	78.5	12.4	82.2	13.5	86.1	10.6	73.4	11.9	80.2	12.6	83.8

The analyses were made within one or two days after harvesting. The sucrose content showed no great variation until the last two weeks, when the beets were of lower quality, probably due to over-ripeness. This season was extremely favorable for the crop, as warm rains hastened germination and light, warm showers, while the beets were young, contributed to rapid growth.

The beets were of uniform size. Table 5 shows the variation of weight in the above beets harvested for analytical data.

TABLE 5

Average Weight of Beet Analyzed—Grams

Date of Harvest	Jaensch Victrix 12844	Great Western Home Grown	Variety Kleinwanzleben	Alvarado	Kleinwanzleben elite	Dippe
May 9	440	385	420	440	340	480
May 16	420	520	530	480	665	470
May 23	475	540	675	610	745	515
May 30	675	615	560	630	585	505
June 6	595	750	610	565	725	635
June 13	760	815	850	780	1080	840
June 20	490	675	785	605	715	390
June 27	565	670	690	620	520	545
July 4	555	530	585	640	590	515
July 11	500	550	630	600	740	525
July 18	425	360	360	650	695	360
July 25	495	385	350	555	415	360

In sampling no attempt was made to select the beets, but they were taken, in most instances, as they came in the row. It was considered that this would give a fairer test than by taking them here and there in the rows.

The yield per acre was considered high. It is reported in Table 6.

TABLE 6

Calculated Yield per Acre—Tons

Variety					
Jaensch Victrix 12844	Great Western Home Grown	Kleinwanzleben	Alvarado	Kleinwanzleben elite	Dippe
17.5	19.2	19.7	19.8	20.9	17.2

A careful record of the labor required to prepare the seed bed and grow the beets was kept and calculated to the acre basis in man and horse hours. The man hours were 73.5 and horse hours 29. This low labor cost was due to the favorable season. In view of the fact that the beets are grown during the winter season, very few weeds will grow, which decreases the amount of hand labor. Usually one hoeing only is necessary which, together with the thinning, makes two times over the field with hand work. This leaves the bulk of the cultivation with horse-drawn tools, such as the five-tooth and the fourteen-tooth one-horse cultivators, together with a small middle-burster. This low cost of hand-labor production may prove of great value.

1921-1922

In 1921, seed of the same varieties and from the same sources was obtained as in 1920. The plat used for this purpose was planted in corn and velvet beans in 1920 and soy beans in 1921. As soon as the beans were harvested for hay, the plat was broken about eight inches deep with a 26-inch reversible disc plow and thoroughly disced. Rows three feet wide were laid off and seeding begun on November 27, and continued every four weeks until four plantings were made. Two duplications of each variety on each date were planted. A cold rain as the plants of the third seeding were coming through the ground, caused a considerable number to die though extra hand labor saved a fair stand. Other plantings came up to a good stand. The analytical data will be presented in Table 7.

TABLE 7

Date Harvested for Analysis	Kleinwanzleben (Michigan grown seed)								Great Western Home Grown								Jaensch Victrix 12844							
	Date of Planting								Date of Planting								Date of Planting							
	Nov. 27		Dec. 27		Jan. 23		Feb. 17		Nov. 27		Dec. 27		Jan. 23		Feb. 17		Nov. 27		Dec. 27		Jan. 23		Feb. 17	
	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity
May 1	14.1	83.6	...	...	...	...	...	...	13.4	81.2	...	...	...	...	...	...	12.7	81.0	...	...	...	...	...	...
May 8	11.6	83.5	11.7	77.4	11.0	79.2	...	...	14.3	87.2	11.7	83.4	11.7	79.2	...	...	12.5	81.7	11.4	81.3	11.1	79.6	...	...
May 15	14.5	83.8	14.0	84.8	12.4	80.0	...	...	14.7	82.5	13.0	81.2	12.5	81.8	...	...	13.3	82.6	13.2	84.7	13.0	77.8	...	...
May 22	14.8	85.7	13.4	83.8	13.0	83.4	11.7	83.5	15.0	84.4	13.8	84.7	14.4	86.7	11.3	80.8	14.7	85.0	13.4	83.8	13.5	84.7	11.1	81.6
May 29	14.9	86.8	13.7	88.8	12.0	83.5	12.0	83.7	13.4	83.2	13.3	85.2	14.6	88.9	12.0	85.1	13.5	83.5	11.8	81.4	12.7	85.2	12.2	83.1
June 5	14.4	87.9	15.0	91.0	13.9	88.6	13.5	88.2	15.0	90.5	13.0	86.7	15.0	90.1	13.3	86.8	14.6	92.0	13.9	89.5	14.1	87.8	12.8	83.7
June 12	13.9	87.1	12.4	86.3	14.4	92.2	11.5	85.9	15.5	89.0	12.7	86.4	13.0	85.0	12.0	88.3	13.3	90.0	12.5	85.8	13.2	87.2	13.2	88.2
June 19	13.6	82.8	12.4	83.6	12.7	83.6	13.1	81.7	11.4	80.1	14.8	87.0	12.4	83.8	12.7	82.7	14.0	87.0	12.7	81.0	11.6	83.7	12.7	83.0
June 26	11.7	81.9	12.2	80.6	12.0	83.8	11.8	81.4	13.3	83.5	12.1	83.7	12.3	81.6	12.1	81.3	12.3	84.2	12.0	82.1	11.5	79.4	11.3	80.2
July 3	12.0	82.1	12.7	84.6	12.7	83.6	12.7	83.7	12.5	82.5	12.3	84.8	12.5	84.5	13.3	85.3	9.4	76.5	12.0	82.7	11.2	81.4	12.6	84.5
July 10	10.6	80.0	11.9	82.1	13.0	81.3	12.5	82.1	12.7	83.7	11.6	81.7	12.9	81.5	12.0	81.5	10.5	80.7	11.4	80.7	11.9	80.5	11.5	81.0
July 17	...	...	...	...	10.9	79.7	9.0	75.4	...	...	...	...	11.7	81.7	12.0	81.6	...	...	...	...	10.2	77.7	10.5	79.0

TABLE 7—Continued

Date Harvested for Analysis	Dippe								Kleinwanzleben (German grown seed)								Alvarado							
	Date of Planting								Date of Planting								Date of Planting							
	Nov. 27		Dec. 27		Jan. 23		Feb. 17		Nov. 27		Dec. 27		Jan. 23		Feb. 17		Nov. 27		Dec. 27		Jan. 23		Feb. 17	
	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity	Per cent sucrose	Purity
May 1	14.1	86.5	...	...	...	...	...	...	14.1	84.0	...	...	...	...	...	...	13.9	84.3	...	...	...	...	...	..
May 8	12.8	83.5	11.7	78.0	10.0	72.0	...	...	13.1	84.5	12.0	82.8	11.5	85.9	...	...	13.2	84.0	12.3	82.4	9.7	76.3	...	...
May 15	13.7	82.5	14.1	83.0	12.5	80.6	...	...	13.9	84.1	14.2	85.0	12.3	84.1	...	...	14.5	84.0	14.6	86.0	12.4	79.1	...	...
May 22	13.7	85.0	12.6	82.1	14.1	84.9	10.5	78.6	14.7	85.5	12.5	82.2	13.1	83.1	11.6	82.2	14.4	84.1	12.5	82.2	11.3	80.8	11.3	78.5
May 29	15.9	92.0	12.8	85.4	13.2	84.2	11.1	79.7	13.7	85.6	13.7	85.6	11.5	82.9	11.1	81.6	13.6	86.2	13.9	89.1	12.0	85.1	11.0	82.1
June 5	14.7	88.8	13.6	87.8	14.2	88.7	12.9	87.3	15.1	89.9	14.1	89.7	14.0	83.3	13.3	88.6	14.3	88.3	14.5	84.5	13.6	88.4	13.3	87.5
June 12	13.5	88.2	12.9	85.0	13.6	90.0	12.1	87.8	14.5	88.0	14.5	86.7	13.3	87.1	13.0	88.2	13.0	91.5	13.1	87.8	14.4	92.2	12.8	89.5
June 19	14.0	85.4	12.9	83.2	12.9	81.2	13.7	86.6	12.4	82.6	15.0	85.5	13.3	81.6	12.6	83.5	13.8	84.6	13.7	86.1	12.6	82.3	13.1	81.7
June 26	11.8	81.6	12.5	82.3	12.3	82.6	11.4	80.5	11.9	80.9	11.9	80.0	12.3	83.6	11.7	81.8	11.0	80.3	11.4	78.5	13.3	83.4	13.1	84.5
July 3	11.7	81.7	12.7	84.8	12.7	85.1	11.9	81.5	12.9	84.2	12.2	87.2	12.3	82.0	12.0	85.8	12.6	84.4	12.3	84.4	13.2	83.5	12.6	83.1
July 10	11.7	81.8	11.0	82.0	12.5	84.5	11.2	80.3	11.8	82.0	10.7	77.2	11.6	81.7	12.7	82.5	11.6	83.8	12.7	83.0	12.7	84.0	12.8	84 7
July 17	...	...	...	...	11.2	80.7	9.8	74.5	...	...	...	...	10.9	79.7	10.5	79.1	...	...	...	...	10.4	80.0	9.2	78.0

The first planting, November 27, matured beets earlier and the first samples were gathered May 1. The second and third plantings were harvested first on May 8 for analyses, but the beets were really not ready until May 15. The last planting was three to four weeks later. It is probable that the early planting is the better, as the beets can get a start before cold weather begins, particularly the cold rains, and it is much easier, as a general rule, to get the seed up to a stand. The sucrose content will average somewhat lower than in 1921 for all plantings except the first, which is practically the same.

There was less variation in the size of the beets than in 1921, as shown in Table 8.

TABLE 8

Average Weight of Beet Analyzed—Grams

Variety	Date of Planting			
	Nov. 27	Dec. 27	Jan. 23	Feb. 17
Jaensch Victrix 12844	880	590	570	580
Great Western Home Grown	965	770	600	670
Kleinwanzleben	650	640	720	665
Alvarado	605	670	640	650
Kleinwanzleben elite	610	640	690	575
Dippe	690	575	605	670

The date of planting had a decided influence on the yield per acre. The early planting produced a larger tonnage with all varieties, except two. The data are presented in Table 9.

TABLE 9

Calculated Yield per Acre—Tons

Variety	Date of Planting			
	Nov. 27	Dec. 27	Jan. 23	Feb. 17
Jaensch Victrix 12844	22.8	16.6	13.2	13.8
Great Western Home Grown	16.6	16.6	16.6	11.4
Kleinwanzleben	23.9	17.0	14.1	15.4
Alvarado	23.9	16.1	13.2	15.8
Kleinwanzleben elite	22.1	19.8	14.5	13.6
Dippe	17.2	22.0	13.2	15.6

As in 1921, the cost of production was recorded. One hundred ten hours of man labor and 60 hours of horse labor were required to make the crop, calculated to the acre basis. The extra labor was necessary, for heavy rains during the early spring caused the surface soil to pack.

1922-1923

Seed of the following varieties were obtained for this season:

Variety	Source
Sperling Type A elite	Sugar Plant Investigations, Bureau Plant Industry.
Kleinwanzleben and Dippe (Mixed)	Sugar Plant Investigations, Bureau Plant Industry.
Kleinwanzleben elite	Sugar Plant Investigations, Bureau Plant Industry.
Jaensch Victrix 12844	Utah Experiment Station, Logan.
Great Western Home Grown	The Great Western Sugar Co., Denver, Colorado
Glostrup	Hjalmar Hartmann & Co., Copenhagen, Denmark.
Erhard Fredericksen's Best Danish Strain	G. D. Von Phul, New Orleans, Louisiana.

The plat used this year was not as uniform as the ones used in previous years. Cotton and corn and velvet beans were the crops for the two preceding years. It was plowed November 27, with a 26-inch reversible disc plow to a depth of about eight inches, turning under the corn stalks and bean vines. Rows three feet apart were laid off November 29. A fair seed bed was prepared and the first planting was made December 2. All varieties came up to a good stand except the Kleinwanzleben elite and Erhard-Fredericksen. The other planting dates were December 30, January 10, and January 30. All plantings on these three dates were failures, due to adverse weather conditions, and the few beets which grew were not harvested. It is almost impossible to obtain a stand if the soil is too moist or if cold rains follow immediately after planting. Beet seed contain a very small amount of plant food, so the small seedling must draw upon the soil for food very soon after germination. This season was abnormal. Three duplications were made in the first planting and the analytical results are shown in Table 10.

TABLE 10

Date of Planting—December 2, 1922

Variety

Date Harvested for Analysis	Jaensch Victrix 12844		Great Western Home Grown		Kleinwanzleben Dippe (Mixed)		Kleinwanzleben elite		Glostrup		Sperling Type elite A	
	Per Cent Sucrose	Purity	Per Cent Sucrose	Purity	Per Cent Sucrose	Purity	Per Cent Sucrose	Purity	Per Cent Sucrose	Purity	Per Cent Sucrose	Purity
May 21	10.2	84.8	10.0	83.7	10.5	86.5	...	...	10.3	85.4	10.9	86.1
May 28	12.3	85.0	13.1	83.5	11.6	76.2	...	...	13.3	85.2	13.9	80.4
June 4	13.6	83.9	12.5	80.0	14.5	82.3	...	...	14.1	83.9	14.5	83.8
June 11	13.8	83.5	14.7	83.9	14.7	84.8	...	...	13.8	84.4	13.6	82.6
June 18	13.4	83.9	13.0	79.4	14.5	86.9	12.6	81.1	14.3	85.6	14.6	86.7
June 25	13.4	84.5	12.3	83.2	15.0	83.1	12.6	82.8	13.7	84.5	13.3	82.5
July 2	12.4	81.9	11.8	83.0	13.9	86.4	11.8	81.6	14.0	86.5	11.0	80.0

In Table 10 the beets were not sufficiently mature to harvest until May 28. From May 28 to July 2, inclusive, the sugar content did not show much variation. The Kleinwanzleben elite was harvested for analysis only three times and then gave a low per cent of sucrose. The short season and late maturity was probably due to the excessive rainfall and cold weather. The writer's diary indicates that there were only 140 days of sunshine without rain, 126 cloudy and threatening days and 99 rainy days at the Experiment Station Farm in 1923. Many of the cloudy and threatening days were cold. The beets made a fairly good growth and five varieties did not show very much difference in sucrose.

The average size of the beets harvested for analyses is given in Table 11.

TABLE 11
Average Weight of Beet Analyzed—Grams

Variety				
Jaensch Victrix 12844	Great Western Home Grown	Kleinwanzleben and Dippe (Mixed)	Glostrup	Sperling Type A elite
370	405	475	410	460

Comparing the weight of the beets analyzed with those of the previous years, it will be noticed that they are considerably smaller. It was impossible to keep the soil in a loose condition, which may account for the small size.

The yield per acre is shown in Table 12.

TABLE 12
Calculated Yield per Acre—Tons

Variety				
Jaensch Victrix 12844	Great Western Home Grown	Kleinwanzleben and Dippe (Mixed)	Glostrup	Sperling Type A elite
7.9	10.0	8.8	7.3	8.2

The yield per acre was a decided decrease from the other two years. It is believed that the abnormal weather contributed to this condition. The yield of sugar cane and the number of pounds of sugar recovered from a ton of cane was considerably decreased from the normal in 1923. Here, again, seasonal influences played a large part, though had the planting been earlier, the tonnage would probably have been greater.

In co-operation with Mr. G. D. Von Phul, New Orleans, sugar beet seed of two varieties was distributed to a number of interested persons living in the sugar-cane section of Louisiana. Von Phul distributed the seed at his own expense. Data from this co-operative project are given in Table 13.

TABLE 13

Analytical Data of Beets Grown Away from the Experiment Station—1923

Grown by	Date Harvested for Analysis	Variety					
		Great Western Home Grown		Erhard-Fredericksen		Kleinwanzleben	
		Sucrose	Purity	Sucrose	Purity	Sucrose	Purity
R. T. Gibbens, Minerva, La., Lafourche Parish.....	May 10.....	6.5	63.5	...	...	...	...
	June 7.....	11.6	78.6	12.1	79.8	...	...
	July 5.....	10.1	76.7	10.6	75.6	...	...
Dugas & LeBlanc, Paincourtville, La., Assumption Parish	May 10.....	8.7	74.7	...	...	...	...
	June 7.....	11.3	77.2	...	...	...	...
R. G. Malhiot, Killona, La., St. Charles Parish.....	May 10.....	12.1	84.7	7.5	68.2	...	...
	June 7.....	12.9	81.3	12.0	78.7	...	...
	June 29.....	11.2	80.4	10.8	79.1	...	...
	July 5.....	9.9	78.7	...	...	...	...
	July 15.....	9.0	73.7	...	...	...	...
Pitcher Bros., Lakeland, La., Pointe Coupee Parish....	May 10.....	9.9	74.9	...	...	...	...
	June 22.....	10.8	77.8	...	...	...	...
	July 2.....	11.4	80.1	...	...	...	...
P. G. Songy, Wallace, La., St. James Parish.....	May 10.....	10.4	76.5	...	...	...	...
	June 5.....	14.4	84.2	...	...	...	...
	June 28.....	12.0	83.2	...	...	...	...
	July 10.....	12.1	83.7	...	...	...	...
Laurel Grove Co., Thibodaux, La., Lafourche Parish...	June 19.....	12.8	79.2	...	...	...	...
	June 30.....	8.6	77.1	...	...	...	...
Devall Planting Co., Chamberlin, La., West Baton Rouge	June 2.....	8.1	76.1	...	...	...	...
E. E. Wunsch, Denham Springs, La., Livingston Parish..	May 30.....	...	...	...	...	17.2	90.1

The variety grown by Mr. Wunsch was Kleinwanzleben, and the seed was purchased by him. Denham Springs is 15 miles east of Baton Rouge. The soil in that vicinity is considerably coarser in texture than the bluff soils adjacent to the Mississippi River. The high sucrose content may be due to a difference in soil type.

The beets grown in the alluvial lands of the Mississippi River showed a marked decrease in sucrose content but gave a large yield. This being the first year that beets, for analytical purposes, have been grown in these soils, it is impossible to state any conclusions.

The calculated yield per acre of the beets grown in the co-operative experiment are given in Table 14.

TABLE 14

Calculated Yield per Acre—Tons

Grown by	Variety: Great Western Home Grown	Variety: Erhard-Fredericksen
R. T. Gibbens	14.5	15.8
Dugas & LeBlanc	15.8	...
R. G. Malhiot	26.7	17.6
P. G. Songy	22.9	...

1923-1924

It proved rather difficult to get seed for this season. However, the following varieties were finally obtained:

Variety	Source
Erhard-Fredericksen's Best Danish Strain	C. M. Baumgarten, Bay City, Michigan.
Great Western Home Grown	The Great Western Sugar Co., Denver, Colorado.
Jaensch Victrix 12844	Utah Experiment Station, Logan.
Kleinwanzleben	New Mexico Experiment Station, College Station.
Kleinwanzleben Original "Rabbethge-Giesecke"	National Seed Co., New York.
Glostrup	Hjalmar Hartmann & Co., Copenhagen, Denmark.
Dippe	W. B. Rosevear, Jr., Detroit, Michigan.

All varieties were imported except the Great Western Home Grown, the Jaensch Victrix 12844, and the Kleinwanzleben from New Mexico. It was planned to make four different plantings with three or four weeks intervening. All seed was not obtained until the first of December, and then weather conditions were far from favorable. Only one planting was finally made, January 31, 1924. On that date seven duplications were planted in rows two feet nine inches wide on a plat where corn and cow-

peas and red clover had been grown for a number of years. The soil was broken as heretofore and the seed bed was in very good condition at time of planting. Practically a perfect stand was gotten on all rows. A hard freeze in December and another the middle of January would probably have killed all the plants had earlier planting been possible. The analytical data is shown in Table 15.

TABLE 15

Variety

Date Harvested for Analysis	Erhard-Fredericksen		Great Western Home Grown		Jaensch Victrix 12844		Kleinwanzleben (New Mexico)		Kleinwanzleben (Germany)		Glostrup		Dippe	
	Per Cent Sucrose	Purity	Per Cent Sucrose	Purity	Per Cent Sucrose	Purity	Per Cent Sucrose	Purity	Per Cent Sucrose	Purity	Per Cent Sucrose	Purity	Per Cent Sucrose	Purity
June 6.....	10.0	75.0	9.7	76.0	9.8	77.6	9.9	76.3	9.9	76.3	10.4	75.0	9.3	73.8
June 12.....	11.3	76.7	12.3	81.3	11.9	78.6	12.1	75.3	11.6	79.5	11.0	74.8	11.8	77.1
June 18.....	12.7	80.0	13.8	81.9	12.8	80.6	13.6	82.0	12.8	80.3	13.5	82.6	11.8	78.7
June 26.....	13.7	80.2	15.0	82.0	14.6	81.2	13.7	82.9	15.5	84.6	15.2	84.5	15.6	86.9
July 3.....	14.2	81.8	15.5	81.3	14.8	83.1	14.4	81.3	14.5	84.5	15.2	83.8	14.8	82.7
July 10.....	14.5	81.4	13.7	80.0	11.3	75.5	13.7	78.8	13.8	79.3	14.4	81.5	14.3	79.6
July 17.....	14.0	78.4	15.2	80.9	14.9	82.7	15.6	81.5	15.6	81.2	16.3	84.0	14.6	79.4
July 24.....	13.4	81.0	13.5	83.5	13.6	81.7	13.7	81.6	15.3	82.6	12.5	79.2	13.0	81.2
July 31.....	12.4	79.0	13.7	79.0	14.9	79.3	13.6	80.3	14.3	80.2	13.6	81.9	14.0	82.0

The samples harvested June 6 and 12 were preliminary in order to find out how the sugar content was developing. The growing season had been cold and wet up to the middle of May and the beets made a slow growth. These two analyses should not be considered as a part of the season and the seven analyses following show about the same results as in previous years. The Great Western Home Grown was the highest and most consistent in sucrose content.

The average size of the beets was about the same as in 1923. This data for 1924 are presented in Table 16.

TABLE 16

Average Weight of Beet Analyzed—Grams

Variety						
Erhard-Fredericksen	Great Western Home Grown	Jaensch Victrix 12844	Kleinwanzleben (New Mexico)	Kleinwanzleben (Germany)	Glostrup	Dippe
500	575	550	495	530	470	485

The yield per acre is low again, due, no doubt, to excessive rain and cold weather in early spring. As during the previous season, it was extremely difficult to keep the soil in good tilth. Table 17 shows the tons per acre.

TABLE 17

Calculated Yield per Acre—Tons

Variety						
Erhard-Fredericksen	Great Western Home Grown	Jaensch Victrix 12844	Kleinwanzleben (New (Mexico)	Kleinwanzleben Germany)	Glostrup	Dippe
7.75	8.00	7.70	8.00	8.65	7.70	9.25

The labor cost per acre to grow the beets amounted to 173 man hours and 80 horse hours. Here again, the effect of the seasonal influence is self-evident.

Seed of two varieties was again distributed, the Great Western Home Grown by Mr. G. D. Von Phul of New Orleans, and the Kleinwanzleben (Germany) by the Experiment Station. The extreme cold in December and January killed all of the early plantings. The analytical data of all beets sent to the Experiment Station is given in Table 18.

TABLE 18

Grown by	Date Planted	Date Harvested	Date Analyzed	Variety: Great Western Home Grown % Sucrose	Great Western Home Grown Purity	Kleinwanzleben % Sucrose	Kleinwanzleben Purity
Sterling Sugars Co., Franklin, La., St. Mary Parish	Jan. 12	May 16	May 19	12.64	74.35	....	....
	Jan. 12	June 9	June 12	10.10	72.80	....	....
	Jan. 12	June 15	June 18	12.50	70.70	....	....
Pitcher Bros., Lakeland, La., Pointe Coupee Parish	.....	May 21	May 23	10.89	76.50	....	....
	.....	June 16	June 18	9.20	69.60	....	....
	.....	June 22	June 24	8.70	64.70	....	....
	.....	July 1	July 3	9.80	74.20	....	....
	.....	July 8	July 10	10.00	68.10	....	....
State Farm, Angola, La., West Feliciana Parish	Mar. 5	June 10	June 12	....	....	9.60	70.20
	Mar. 5	June 20	June 24	....	....	12.40	72.50
	Mar. 5	June 28	June 30	....	....	15.30	84.60
T. I. Watson, Tallulah, La., Madison Parish	Jan. 29	June 9	June 12	....	....	11.00	80.50
	Jan. 29	June 15	June 18	....	....	8.50	65.30
	Jan. 29	June 25	June 28	....	....	9.50	70.40
	Jan. 29	Aug. 4	Aug. 6	....	....	9.30	68.90
H. P. Overton, Pride, La., East Baton Rouge Parish	Dec. 31	June 14	June 16	....	....	14.10	83.00
Fruit and Truck Station, Hammond, La., Tangipahoa	.....	June 19	June 20	....	....	15.00	82.60
E. E. Wunsch, Denham Springs, La., Livingston Parish	Mar. 1	June 19	June 20	....	....	13.70	80.20
	Mar. 1	July 2	July 3	....	....	13.50	76.30
	Mar. 28	July 2	July 3	....	....	14.60	80.20
Guy Fletcher, Centerville, La., St. Mary Parish	Mar. 2	July 7	July 9	....	....	19.90	85.00

The results for this year are practically the same as for last season, that is, the beets grown on the heavy alluvial clay soils had a low sucrose content while those grown on the lighter upland soils and the sandy loams of the alluvial sections were about the same as last year. It was impossible to get the yield data on the beets grown co-operatively. There were poor stands in most instances.

The data from the four years' results seem to indicate that sugar beets could probably be grown commercially. However, the writers are not ready to recommend the crop for this purpose. Further experiments will be conducted.

In order to get some idea of the keeping qualities of the beets and to throw some light on the transportation problem, beets were harvested at the Experiment Station and treated to two different conditions. The results are given in Table 19.

TABLE 19

Date Harvested	Date Analyzed	Per Cent Sucrose	Purity	Remarks
June 25.....	June 25.....	13.00	79.30	Sent to laboratory as soon as harvested.
June 25.....	June 26.....	14.90	80.20	Exposed to sun one day in field.
June 25.....	June 30.....	16.20	75.50	Exposed to sun one day in field. Placed in wagon box and exposed to sun four days. Sample taken from top of pile.
June 25.....	June 30.....	13.50	78.90	Same as above. Sample taken from middle of pile.
June 25.....	June 30.....	14.90	80.10	Same as above. Sample taken from bottom of pile.
June 25.....	July 10.....	14.80	72.20	Exposed to sun one day in field. Exposed to sun four days in wagon. Exposed on ground in driveway of barn nine days.
July 9.....	July 9.....	13.50	76.30	Sent to laboratory as soon as harvested.
July 9.....	July 10.....	13.80	74.60	Exposed to sun one day in field.
July 9.....	July 18.....	14.20	74.80	Exposed to sun one day in field and in wagon under shed seven days.
July 9.....	July 24.....	13.40	69.40	Exposed to sun one day in field and in wagon under shed fourteen days.
July 9.....	July 31.....	14.20	65.80	Exposed to sun one day in field and in wagon under shed twenty-one days.

The data in Table 19 indicate that sugar beets may be piled in the field one day after harvesting and then kept in the shade for a week without any great deterioration. If the beets could be placed in a stock car for transportation, which would permit ventilation and at the same time keep them in the shade, it is probable that the movement from field to factory would be a success. Note the difference in the analysis of the sample from the top of the pile in the wagon box after being in the sun for five days, and the analysis of the middle sample, as well as the bottom sample. Beets harvested and exposed to the sun for one day and then stored in the shade for seven days showed practically no deterioration.

Summary

1. Sugar beets contain 13% to 14% sucrose with a purity of 80 to 85, have been successfully grown on the bluff soils adjacent to Baton Rouge and on the cut-over pine lands to the east. Possibly the alluvial soils may also be used for this crop. It is considered that such beets are sufficiently rich in sucrose for commercial purposes.

2. Ten to 15 tons per acre can be produced. The average yield per acre in the United States is approximately 9.5 for a nine-year average.

3. Cost of production is comparatively low.

4. The length of season for harvesting has varied in the past four years from 7 to 12 weeks, beginning about May 1.

5. It is believed that the planting in these tests has not been sufficiently early. September and October plantings will no doubt prove advantageous.

6. Sugar beets generally weigh from one to two pounds when harvested. Uniformity in size, while not necessary, is a good feature.

7. No fertilizers were used in any of the tests at Baton Rouge.